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ENTOMOLOGY.

OCCURRENCE OF COLIAS NASTES IN THE PAMIR MOUNTAINS.—In the Investia of the Russian Geographical Society is a paper by M. Grum-Grzimailo, who has journeyed, says *Nature*, in the mountains north of the Alay region of the Pamir, in Central Asia. On a rich Alpine pasturage, where Kirghizes are in the habit of staying, he found *Colias eogene*, *Arctia erschoffi*, etc., which are common almost exclusively to the Himalayas and the Southwest Thian-Shan. On the plateau between the Kara-Su and the Aram, with other rare Lepidoptera were species of Colias and Parnassius. On the Dje Kaindy pass, the Lycaenæ were numerous, so that in the space of three meters the author found fifteen species of them, of which three were unknown to him. Another find of great interest was that of *C. nastes*. The late Mr. Fedchenko had already caught one female butterfly, which was determined by M. Erschoff as *Colias nastes*. This species having been found formerly only in Labrador and Northern Lapland, the determination remained doubtful, the individual having been but a female. M. Grzimailo has caught a number of both males and females, which really proved both to belong to *C. nastes*. The writer says it remains now to explain the strange extension of this species. He does not seem to be aware that several (nine species) other Labrador Lepidoptera occur in the Altai mountains of Northeastern Asia.

THE EYE AND OPTIC TRACT OF INSECTS.—In his essay on this subject Dr. S. J. Hickson (Quart. Journ. Micr. Science, April) describes in detail the eye and optic tract of the flesh fly (*Musca vomitoria*). The pseudo-cones he has found to be composed of four cells, with their nuclei situated internally, each one containing a large watery or albuminous vacuole, which serves the same purpose, and is morphologically homologous with the crystalline cone of the "eucone" eyes. There are six retinulæ cells, each possessing a nucleus situated in that part of it which lies immediately behind the pseudo-cones, and in some cases an additional nucleus, situated about half-way down. He has figured for the first time the interommatidial tracheal vesicles which have been previously observed by several investigators. In the optic tract he has described three ganglia—the opticon, epi-opticon and peri-opticon. The last of these is composed of a number of small cylindrical elements of a tissue composed of a sponge-work of nerve-fibrillæ, which he has called a "neurospongium." The opticon and epi-opticon are present in all insects, and in most of the higher Crustacea. The peri-opticon appears comparatively late in development, but is never found even in the adults of Periplaneta and Nepa.

The peri-opticon, when present, is usually composed of a number of cylindrical elements, which partially fuse in Æschna and completely in Eristalis, Bombyx and the Crustacea. In Eristalis the peri-opticon is traversed by a number of delicate tracheal vessels.

The terminal optic anastomosis of Nepa is more complicated than it is in Periplaneta, and seems to be an intermediate stage between the simple anastomosis, the true peri-opticon of Musca.

A similar series of intermediate stages between the simple anastomosis and a true peri-opticon has been traced in the development of these parts in the bee.

The development and comparative anatomy of the peri-opticon of insects is interesting, as it may indicate the mode in which central ganglia were first formed from primitive nerve-fibrils and cells.

His investigations seem to him to corroborate the opinion of the majority of previous investigators, that the retinulæ are the true nerve-end cells.

HOW INSECTS ADHERE TO FLAT VERTICAL SURFACES.—Herr H. Dewitz gives an account of some further observations on this subject, tending to prove that the secretion by which, *e. g.*, flies adhere to window panes, is not a thin fluid of a fatty nature, but much more consistent. He adduces experiments to controvert Rombout's view that a fly can maintain itself on a glass surface by one leg only, if that surface be vertical and if the body of the fly be in contact with the glass.—*Journal Royal Microscopical Society, October, 1885.*

SEASON DIMORPHISM IN SPIDERS.—The researches of Weismann into the phenomenon known as seasonal dimorphism among butterflies, are well known. Something of the same kind is stated by Dr. F. Dahl to occur in spiders. In an earlier communication this author had pointed out the fact that *Micrommeta virescens* and *M. ornata* were simply two broods of the same species. He now advances another instance in *Meta segmentata* and *M. menger*, stating his reasons for believing them to be respectively spring and summer broods of the same species.—*Journal Royal Microscopical Society, October, 1885.*

ENTOMOLOGICAL NEWS.—In the twenty-eighth volume of the Annales de la Société Entomologique de Belgique, we notice descriptions of the metamorphosis of *Leptinotarsa undecimlineata* Stål and *Tropisternus lateralis* Fabr., by Dr. Eug. Dugès of Mexico. In the first part of Vol. XXIX of the same Annales C. Van den Branden publishes a catalogue of the aquatic carnivorous beetles. The family Dytiscidæ numbered, according to the Munich catalogue, 893 species; to-day the present catalogue enumerates over 1500 species. C. Kerremans also enumerates the Buprestidæ described since the publication of Gemminger and Harold's catalogue.—— In the Comptes-rendus of the same Society Mr. S. H. Scudder shows that the *Brachypyge carbonis*, described by Dr. H. Woodward as the abdomen of a crab, is in reality the abdomen of an arachnid, of which six species are now known, one from the coal measures of Arkansas.——In A. Walter's article on the morphology of Lepidoptera in the Jenaische Zeitschrit for May, we have an account of the mouth-parts of Acentropus.——The transformations of *Paraponyx oryzalis*, an insect pest of the rice-plant in Burma, are described and well figured by J. Wood-Mason, in a pamphlet printed in Calcutta. Its larva is aquatic and breathes by tracheal gills. We wish the author had given more detailed sketches of the gills and their relation to the body.——We omitted to note Kowalevsky's contribution to the post-embryonal development of the Muscidæ in the Zoologischer Anzeiger for Feb. 23, 1885.

ZOOLOGY.

THE SIGNIFICANCE OF THE CELL NUCLEUS TO THE PROBLEM OF HEREDITY.—The results of the later researches upon fertilization and cell division, have tended to make biologists view the cell nucleus as of pre-eminent inportance for the life of the cell. In 1884, Kölliker, in his Entwickelungsgeschichte, stated, that since fertilization consists essentially in the fusion of a male with a female pronucleus into one segmentation nucleus which entails its hermaphrodite character upon its offspring of cell generations during ontogenetic development, this fact gives us the true reason why, and how every organism resembles its parents. The last two years have been fruitful in discussions of the problem of heredity in the light of nuclear investigations and have stimulated Kölliker to expand the above statement with more completeness and detail in the paper[1] of which this article is an abstract.

From our present knowledge of the biology of the cell nucleus we may draw certain conclusions of great value as a basis for the discussion of the problem of heredity, as follows:

The nucleus, and it alone, contains a substance which possesses the power of building up an organism according to specific characters, making it resemble the parents from which the nucleus originally came—in other words, possesses the hereditary power.

This follows from:

(*a*) *The nature of the spermatozoön:*

We know that but one spermatozoön is needed in the fertilization of one egg; we know that this must carry the hereditary traits of the father which he received from his ancestors both male and female; each spermatozoön is a nucleus.

Kölliker, in 1844, held the spermatozoön to be the equivalent of a cell, but later came to the conclusion that it represents a nucleus. Other biologists agreed with Kölliker so far as the *body* of the spermatozoön is concerned; but the *flagellum*, they said represents the cell protoplasm; and hence a spermatozoön may

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[1] "Die Bedeutung der Zellenkerne für die Vorgänge der Vererbung." Zeitschrift für Wissenschaftliche Zoologie. Band XLII, erstes heft. July, 1885.